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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,624	10/27/2003	Philip L. Cole	COPL:002US	2611

32425 7590 10/14/2008
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EXAMINER	
DUDNIKOV, VADIM	
ART UNIT	**PAPER NUMBER**
3663	
MAIL DATE	**DELIVERY MODE**
10/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/694,624	COLE, PHILIP L.
	Examiner	Art Unit
	VADIM DUDNIKOV	3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-33* is/are pending in the application.

4a) Of the above claim(s) *4,5 and 10-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,7,9 and 28-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendment filed 7/11/2008 forms the basis for this Office Action.

Specification and Drawings have been amended. Claim 8 has been canceled before. Claims 1-7 and 9-33 have been pending. Claims 4-5 and 10-27 have been withdrawn from consideration as non-elected. Claims 1-3, 6, 7, 9, and 28-33 have been examined. Comments on Remarks submitted with said amendments are included below under Response to Arguments.

2. Declaration of Dr. Philip L. Cole under 37 CFR 1.132 filed on 7/11/08 has been considered but it is ineffective to overcome the Neale reference.

Particularly, regarding Arguments (3, 7 and 9), Neale's detection system is capable for "detecting an emerging photon beam within an energy range from about I MeV to about 50 MeV" with a set of scintillator detectors" : see "an alternative composite detector" shown in FIG. 15, (column 19, lines 59+) comprising a plurality of serial detectors (172, 186, 188, 190, 192 with sensitivity to photon with different energy ranges) placed in path of emerging photon beam. It is well known in art of radiation detecting, that efficiency of electron-positron pair generation by high energy photons increases with energy increase according a Groom's teaching in FIG. 24.2. The high energy X-rays are absorbed by the photoelectric process which has strong energy dependence"; (column 8, lines 13-44)).

The transmitted X-rays are detected by **pairs of crystals** placed one behind the other the **front crystal** being sensitive to lower energy X-rays while the **rear crystal** is sensitive to higher energy X-rays, lower energy X-rays being filtered out using appropriate screens. An alternative composite detector shown in FIG. 15, (column 19, lines 59+) comprising a plurality of serial detectors (172, 186, 188, 190, 192 with sensitivity to photon with different energy ranges) placed in path of emerging photon beam.

Good discrimination is possible at low X-ray energies because of the strong variation with energy of the transmission coefficient for the crystals of the X-ray detectors. The X-rays are absorbed by the photoelectric process which has strong energy dependence"; (column 8, lines 13-44)).

Applicant's Arguments (4, 6) are not persuasive because those Arguments are not related to claim language.

Applicant's Argument (5) is not persuasive because Neale teaches: an alternative composite detector shown in FIG. 15, (column 19, lines 59+) comprising a plurality of serial detectors (172, 186, 188, 190, 192 with sensitivity to photon with different energy ranges) placed in path of emerging photon beam.

Applicant's Arguments (8, 9) are not persuasive because Neale teaches:

"Material **discrimination** arises from the energy dependence of the transmission coefficient being different for different materials", in title, abstract, column 8, lines 7+), comprising: casting an incident photon beam (**18** in FIG. 4) from an electron beam

accelerator (**10** in FIG.4; using a **single broad band** linear accelerator **X-ray source**) through the interrogated vessel on the fissile material (**12** in FIG. 3).

More detailed answers are presented in the claims rejection by referring to the prior art references.

Response to Arguments

3. Applicant's arguments see pages 10-25, filed 7/11/2008, with respect to the previous Office action have been fully considered but they are not fully persuasive. Those objection and rejections that have been overcome by amendment and arguments are omitted from the current Office Action and are to be considered withdrawn.

Applicant's Arguments on page 13, lines 4+ regarding Specification objection is not persuasive because limitation of claim 1 "A method of identifying fission material" required to enable a method allowing to distinguish the fissile and non-fissile material with the same or very close atomic number. According to Applicant recitation of the specification an conclusion on pages 13, 14 : "The ability to tune the PPAD 200 allows detection of **materials of varying atomic numbers**" but does not allow to distinguish the fissile and non-fissile material with the same or very close atomic number and prevent or minimize a "positive alarm".

Applicants assert: "Specification, pg. 11, lines 5-11. This section of the specification in combination with the figures and other descriptions in the specification enable one skilled in the art to perform a method for identifying a fissile material, or more

specifically uranium, within an interrogated vessel" is not persuasive because not all Uranium isotopes are fissile materials.

According to a definition: "A material that can produce a self-sustaining chain reaction by itself is said to be fissile (see Knief, "Nuclear Engineering, Hemisphere Publishing Corporation, 1992, pages 4, 10, 41; cited before). For this reason the Specification fails to enable the invention. The method steps disclosed in application enable the detection of **materials of varying atomic numbers but not the fissile material particularly.**

Applicant's arguments on pages 17+ relating the claims rejection under 35 USC 103 are not persuasive and rejection of claims 1-3, 6, 7, 9 and 28-33 under 35 USC 103 is proper because Neale teaches limitation of claim 1 in view of Guhnter and Groom: (using a **single broad band** linear accelerator **X-ray source and using several photon detectors with different ranges of energy sensitivity)** "a more preferred arrangement in which a **single broad band** linear accelerator **X-ray source** 40 produces X-rays in the range 1-10 MeV and as previously mentioned collimators (not shown) are used to form a narrow fan beam of X-ray 42 which if the linear accelerator 40 is spaced some meters from a shipping container such as 32, will embrace the full height of the container. Beyond the container is located an additional collimator (not shown) and a tall column of detector elements 44 each of which is adapted to respond separately to low energy (photons as show in Fig. 6, 7) electrons and high energy (photons as show in Fig. 6, 7) electrons (typically 1 MeV and 5 MeV respectively) transmitted by the container 32, to produce two separate outputs one corresponding to the quantity of X-rays of the lower energy and the other the quantity of X-rays of the

higher energy received by the detector" (column 12, lines 44+). Groom's teaching supports a capability of Neale's detector to detect photon with energy range up to 50 MeV as detailed in previous Office Action. Gunther's teaching supports using an array of fission-fragment detectors and the array of fission-fragment detectors is sensitive to different ranges of photon beam energy as one of energy sensitive photon detector in Neale's detection system.

Neale's teaching also support a limitation of claim 1: energy sensitive detectors are arranged **sequentially** in a direct path of the emerging photon beam such that each receives the emerging photon beam (detected by **pairs of crystals** placed **one behind the other** the **front crystal** being sensitive to **lower energy** X-rays while the **rear crystal** is sensitive to **higher energy** X-rays), and are sensitive to different ranges of photon beam energy.

Rejection of claims are established in light of further consideration and search of the prior Art. See rejections underneath.

Specification

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The specification is objected to because the limitation "identifying fissile material within an interrogated vessel" claim 1, is not enabled in specification, as filed. Said limitation requires enabling a method allowing distinguishing the fissile and non-fissile

material with the same or very close atomic number. According to Applicant recitation of the specification an conclusion on pages 13, 14 : “The ability to tune the PPAD 200 allows detection of materials of varying atomic numbers” but does not allowed to distinguish the fissile and non-fissile material with the same or very close atomic number and prevents or minimize a “positive alarm”.

Application as filed is enabled for “determining a range of an atomic number of material in a container” but cannot distinguish a fissile material from a non-fissile material with the same or close atomic number. According to definition: ”A material that can produce a self-sustaining chain reaction by itself is said to be fissile” (see Knief, "Nuclear Engineering, Hemisphere Publishing Corporation, 1992, pages 4, 10, 41; cited before). For this reason the Specification fails to enable the invention.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims **1-3, 6, 7, 9 and 28-33** rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim 1 contains subject matter, “identifying fissile material within an interrogated vessel” which was not described in the

specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The reasons for this rejection are the same as those for the objection to the Specification for lack of enablement as detailed in section 5.

Claims **2, 3, 6, 7, 9** and **28-33** are rejected as depended on rejected claim 1.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims **1-3, 6, 7, 9 and 28-33** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention for the reasons set forth in section 5 and 7 above, because the metes and bounds of the limitation " identifying fissile material within an interrogated vessel" have not been set forth.

In response to applicants arguments that applicant has not stated anywhere other than the application as filed that the invention is something different from what is recited in the claims it must be noted that according to MPEP 2111.01,

10. Claims **1-3, 6, 7, 9 and 28-33** rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps in claim 1, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps in “A method of identifying fission material” are: distinguishing the fissile and non-fissile material with the same or very close atomic number.

Claims **2, 3, 6, 7, 9** and **28-33** are rejected as depended of rejected claim 1.

Claim rejections – 35 USC § 103

11. The following is a quotation of USC 103 (a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims **1-3, 6, 7, 9,** and **28-33** are rejected under 35 U.S.C. 103(a) as being obvious over Neale et al. (U.S. Patent # 5,524,133; Neale hereinafter, cited before) in view of Gunther et al, ("Applicability of a simple parallel plate avalanche detector to photofission experiments", Nucl. Instrum. Methods, 163, 459-461, 1979; Gunther hereinafter, cited before) and in view of Groom ("Photon and electron interaction with matter", LBNL, 1998, p. 152, 153, cited before).

As best as can be understood because of the indefiniteness as discussed above, considering independent Claim **1,** Neale teaches (Title, Abstract, FIG. 2, FIG. 3, FIG. 4, column 1, lines 16-67, column 2, lines 1-67): "A method for identifying a fissile material <u>within an interrogated vessel</u> ("Material **discrimination** arises from the energy dependence of the transmission coefficient being different for different materials", in title, abstract, column 8, lines 7+), comprising: casting an incident photon beam (**18** in FIG. 4) from an electron beam accelerator (**10** in FIG.4; using a **single broad band**

linear accelerator **X-ray source**) through the interrogated vessel on the fissile material (**12** in FIG. 3); detecting an emerging photon beam within an energy range from about 1 MeV to about 50 MeV from the fissile material with an array of energy sensitive detectors , a first set of scintillator paddles, and a second set of scintillator paddles (**22** in FIG. 4; detected by **pairs of crystals** placed **one behind the other** the **front crystal** being sensitive to **lower energy** X-rays while the **rear crystal** is sensitive to **higher energy** X-rays; column 8, lines 9+), herein the array of energy sensitive detectors are sensitive to different ranges of photon beam energy **(**as shown in Figs. 2, 3; column of detector elements 44 each of which is adapted to respond separately to **low energy** (photons as show in Fig. 6, 7) and high energy (photons as show in Fig. 6, 7) (typically 1 MeV and 5 MeV respectively) transmitted by the container 32, to produce two separate outputs one corresponding to the quantity of X-rays of the lower energy and the other the quantity of X-rays of the higher energy received by the detector (column 12, lines 44+)**)** are arranged **sequentially** (detected by **pairs of crystals** placed **one behind the other** the **front crystal** being sensitive to **lower energy** X-rays while the **rear crystal** is sensitive to **higher energy** X-rays) in a direct path of the emerging photon beam such that each receives the emerging photon beam, and are sensitive to different ranges of photon beam energy; obtaining signals from detectors sensitive to different ranges of X-rays energy, a second signal from the first set of scintillator paddles, and a third signal from the second set of scintillator paddles each signal indicative of photon yield within the different ranges of photon beam energy (as shown in Fig. 3; column 3, lines 44+; to produce two separate outputs one corresponding to the

quantity of X-rays of the lower energy and the other the quantity of X-rays of the higher energy received by the detector" (column 12, lines 44+)); and determining a photon energy regime of the emerging photon beam through identification of a drop in photon yield (photon attenuation) in at least one of the three (several) signals (column 3, lines 44+), the determined photon energy regime identifying the fissile material (detection and procession systems in Fig. 12, 13; column 3, lines 44+). (Material **discrimination** arises from the energy dependence of the transmission coefficient being different for different materials. The transmitted X-rays are detected by **pairs of crystals** placed **one behind the other** the **front crystal** being sensitive to **lower energy** X-rays while the **rear crystal** is sensitive to **higher energy** X-rays. Good discrimination is possible at low X-ray energies because of the strong variation with energy of the transmission coefficient for the crystals of the X-ray detectors. The X-rays are absorbed by the photoelectric process which has strong energy dependence; (column 8, lines 7+). The X-ray detectors may be crystals of zinc tungstate or cadmium tungstate in which event the X-ray photons are converted by the crystals into electromagnetic radiation in the visible range and the photons of visible light can be detected and quantified using a photo-electric sensor adapted to generate from the light emitted from the crystal an electric current which can be measured to give a numerical value proportional to the X-ray photon population incident on the appropriate crystal. As well known in the art of high energy photon detection (see for example Groom Fig. 24.1) the photon attenuation length for photons with energy up to 50 MeV is below 100 g/cm^2 and it is less than for photons with energy 5 MeV in a high atomic number Z material. Therefore design

(thickness) of **rarer crystal** detector is enough for absorption and detection of photons with energy **up to 50 MeV**). Neale's detectors are capable to detect photon beam within an energy range from about 1 MeV to about 50 MeV, which meets claim limitation.

Neale does not necessarily teach the limitation that a first detector is "an array of fission-fragment detectors and the array of fission-fragment detectors are sensitive to different ranges of photon beam energy " and "obtaining a first signal from the array of fission-fragment detectors".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Gunther drawn to detection of photons with determined range of energy in the field of photo fission fragment detection, hence analogous art, who teach to "applicability of a parallel plate avalanche detector to photofission detection (PPAD fission fragment detector) which can be used for high sensitive and selective detection of photons in photofission energy range and is insensitive to gamma background of photons with other energies (p. 462, column1, lines 8-29). Motivation for said inclusion derives from Gunther and Groom: because "Cross section of heavy nucleus photofission is large for photons with the energy of photofission range above ~5 MeV, (see cross section of photofission σ_{nucl} in Fig. 24.3,) and this is useful for increase an efficiency of said photons detection and fission fragment detectors are insensitive to gamma background of photons with energies out of photofission range".

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an existing and well tested detector as

disclosed by Gunther in the teaching by Neale to use photofission fragment detector as one of the energy sellective detector for sellective registration of the photons in photofission energy range and this using can improve material discrimination.

There is a common knowledge a dependence on a material atomic number Z of the X-ray energy spectrum transformation after transmission X-ray through material with the different atomic numbers Z (disclosed by Groom, Fig. 24.1, 24.2, 24.3, 24.4, 24.5).

There is a common knowledge that said spectrum transformation can be determined by X-ray energy spectrum registration with attenuating material and without attenuation material by known energy resolving X-ray detectors and photon detection in several energy ranges is enough for material Z identification (as disclosed by Neale). Some version of detectors sensitive for different ranges of X-ray energy spectrum is disclosed by Neale. It is obvious for ordinary skill in the art of radiation detection to use available energy selective fission –fragment detectors for detecting of photons in corresponded range of X-ray energy spectrum as disclosed by Gunther.

Motivation for said inclusion derives from Nealei who teaches: "Material discrimination arises from the energy dependence of the transmission coefficient being different for different materials" (column 8, lines 7+).

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense (see MPEP 4123). The alleged distinction between the claimed "method for identifying fission material" of the invention and cited prior art does not

correspond to any non-obvious claimed limitation. Applicant's method use the same steps as in prior arts. Apparatus disclosed by prior Arts combination is capable to perform the Applicant's method.

On claim **2**, Neal teaches: said identifying comprises determining a range atomic number of the material in a container (**Material discrimination** arises from the energy dependence of the transmission coefficient being different for different materials (abstract, column 8, lines 13-44), and determining the **mean number** Na of X-rays transmitted through a region thereof (in title, abstract, column 1, lines 18-67)).

On claim **3**, Gunther teaches: detecting the emerging photon beam from the material with the array of fission-fragment detectors comprises detecting an energy range of the emerging photon beam in a range between about 10 MeV to 20 MeV " is disclosed by (p. 462, column1, lines 11-29).

Motivation for said inclusion derives from Gunther and Groom: because "Cross section of heavy nucleus photofission is large for photons with the energy of photofission range above ~5 MeV, (see photofission cross sections σ_{nucl} in Fig. 24.3) and this is useful for increase an efficiency and a selectivity of said photons detection and because the fission fragment detectors are insensitive to gamma background of photons with energies out of photofission range".

On claim **6**, Neale teaches: detecting the emerging photon beam from the material with the first set of scintillator paddles comprises detecting an energy range of the emerging photon beam in a range up to about 6 MeV; "The transmitted X-rays are detected by **pairs of crystals** placed one behind the other the **front crystal** being sensitive to lower energy X-rays while the **rear crystal** is sensitive to higher energy X-rays, lower energy X-rays being filtered out using appropriate screens. Good discrimination is possible at low X-ray energies because of the strong variation with energy of the transmission coefficient for the crystals of the X-ray detectors. The X-rays are absorbed by the photoelectric process which has strong energy dependence" (Abstract, in FIG. 2, in FIG. 3, column 8, lines 13-44)).

On claim **7,** Neale teaches: detecting the emerging photon beam from the material with the second set of scintillator paddles comprises detecting an energy range of the emerging photon beam exceeding about 6 MeV; "The transmitted X-rays are detected by **pairs of crystals** placed one behind the other the **front crystal** being sensitive to lower energy X-rays while the **rear crystal** is sensitive to higher energy X-rays, lower energy X-rays being filtered out using appropriate screens. Good discrimination is possible at low X-ray energies because of the strong variation with energy of the transmission coefficient for the crystals of the X-ray detectors. The X-rays are absorbed by the photoelectric process which has strong energy dependence"; (column 8, lines 13-44)).

On claim **9**, Neale teaches: creating a photon distribution energy curve using a combination of the first signal from the array of energy selecting detector, the second signal from the first set of scintillator paddles, and the third signal from the second set of scintillator paddles; (in abstract, in FIG. 2, FIG. 3, Fig. 12, Fig. 13, “The transmitted X-rays are detected by **pairs of crystals** placed one behind the other the **front crystal** being sensitive to lower energy X-rays while the **rear crystal** is sensitive to higher energy X-rays, lower energy X-rays being filtered out using appropriate screens. Good discrimination is possible at low X-ray energies because of the strong variation with energy of the transmission coefficient for the crystals of the X-ray detectors. The X-rays are absorbed by the photoelectric process which has strong energy dependence; (column 8, lines 13-44)). FIG. 13 is a block schematic diagram of the signal processing stages of items 100 and 102 in FIG. 12 and the data processing and computation stage 104 of FIG. 12. Those elements making up each of the items of FIG. 12 are contained in outline boxes appropriately labeled with the corresponding reference numeral from FIG. 12 for ease of reference). Gunther teaches using the fission-fragment detector as energy selecting detector and use signal from this detector for detection og photin flux attenuation in said energy range (as delailed in rejection to claim 1).

On claim **28**, Neale teaches: casting an incident photon beam from the electron beam accelerator comprises directing an electron beam onto a radiator for producing a photon; “detector arrays being disposed respectively opposite **the**

accelerators; Typically the source is a conventional 10 MeV electron linear accelerator with targets and beam hardeners to determine the X-ray spectrum emanating therefrom.", in abstract, Figs. 4, 5, 6,

On claim **29**, Neale and Groom teach: producing electron pairs with a converter coupled to the second set of scintillator paddles; "Each of the detectors is made up of a target typically of tungsten (although any other dense high z material may be used) with two zinc tungstate crystals located on opposite sides thereof and positioned so as to receive photons of energy produced on the one hand predominately by electron-positron pair production (Neale: column 12, lines 61+). A probability of electron-positron pair conversion is high for photons with energy exceeding about 6 MeV (as shown in Fig. 24.2 of Groom)".

On claim **30**, Neale teaches: detecting an energy range of the electron pairs exceeding about 6 MeV (column 2, lines 53+); "Each of the detectors is made up of a target typically of tungsten (although any other dense high z material may be used) with two zinc tungstate crystals located on opposite sides thereof and positioned so as to receive photons of energy produced on the one hand predominately by **electron-positron pair** production; a lead plate will absorb the lower energy photons and transmit only the higher energy photons thereby ensuring that the second zinc tungstate detector only tends to receive energy attributable to electron-positron pair production and virtually none resulting from Compton scatter" (Neale: column n12, lines 61+). "A

probability of electron-positron pair conversion is high for photons with energy exceeding about 6 MeV" (as shown in Fig. 24.2 of Groom).

On claim **31**, Neale teaches:" the array of energy resolving detectors including scintillating detectors: the first set of scintillator paddles is sensitive to a range of photon beam energy up to about 6 MeV, and the second set of scintillator paddles is sensitive to a range of photon beam energy above about 6 MeV; (as shown in Fig. 3;column 10, lines 18+).

Neale does not necessary teach the limitation: the array of fission fragment detectors is sensitive to a range of photon beam energy between about 10 MeV and 20 MeV".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Gunther drawn to detection of photons with determined range of energy in the field of photofission fragment detection, hence analogous art, who teach to "applicability of a parallel plate avalanche detector to photofission detection (PPAD fission fragment detector) which can be used for high sensitive and selective detection of photons in photofission energy range and is insensitive to gamma background of photons with other energies (p. 462, column1, lines 8-29). Motivation for said inclusion derives from Gunther and Groom: because "Cross section of heavy nucleus photofission is large for photons with the energy of photofission range between about 10 MeV and 20 MeV,, (see cross section of photofission σ_{nucl} in Fig. 24.3,) and this is useful for increase an efficiency of said

photons detection and fission fragment detectors are insensitive to gamma background of photons with energies out of photofission range".

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching by Gunther in the teaching by Neale to use photofission fragment detector for sellective registration of the photons in photofission energy range and this using can improve material discrimination.

It is obvious for ordinary skill in the art of radiation detection to use an available fission – fragment detector for detecting if photons in corresponded range of X-ray energy spectrum as disclosed by Gunter.

Motivation for said inclusion derives from Nealei who teaches: "Material discrimination arises from the energy dependence of the transmission coefficient being different for different materials", column 8, lines 7+).

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. The alleged distinction between the claimed "method for identifying fission material" of the invention and cited prior art does not correspond to any non-obvious claimed limitation.

On claim **32**, Neale teaches: the first and second set of scintillator paddles comprise any scintillators transforming high energy photon energy into low energy photons detectable by photosensors, including plastic scintillator paddles (column n11, lines

46+).

On claim **33**, Neale and Gunter teach (as detailed in rejection of claim 31): the array of fission fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles are sensitive to different, but overlapping ranges of photon beam energy.

Motivation for said inclusion derives from Nealei who teaches: “Material discrimination arises from the energy dependence of the transmission coefficient being different for different materials”, column 8, lines 7+).

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VD. 10/2/08

/Johannes P Mondt/
Primary Examiner, Art Unit 3663